Trend Study 19A-7-02

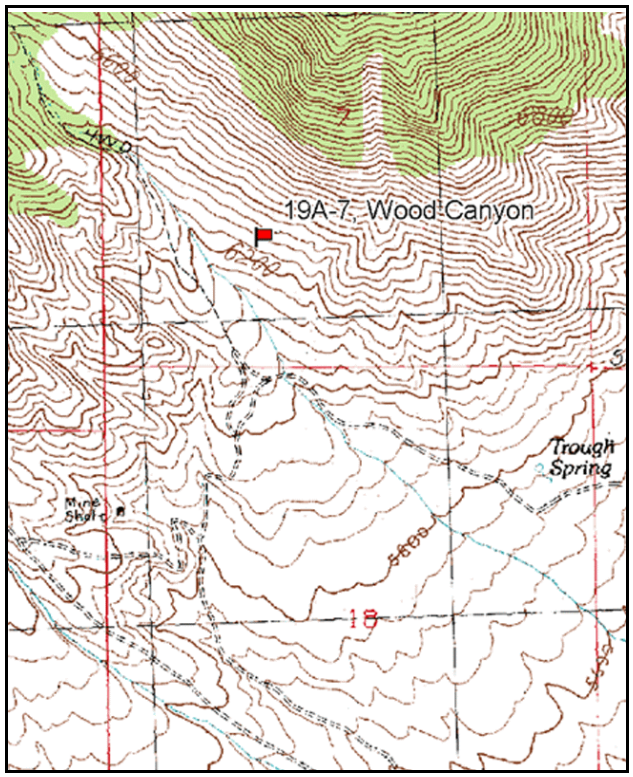
Study site name: Wood Canyon . Vegetation type: Desert Shrub .

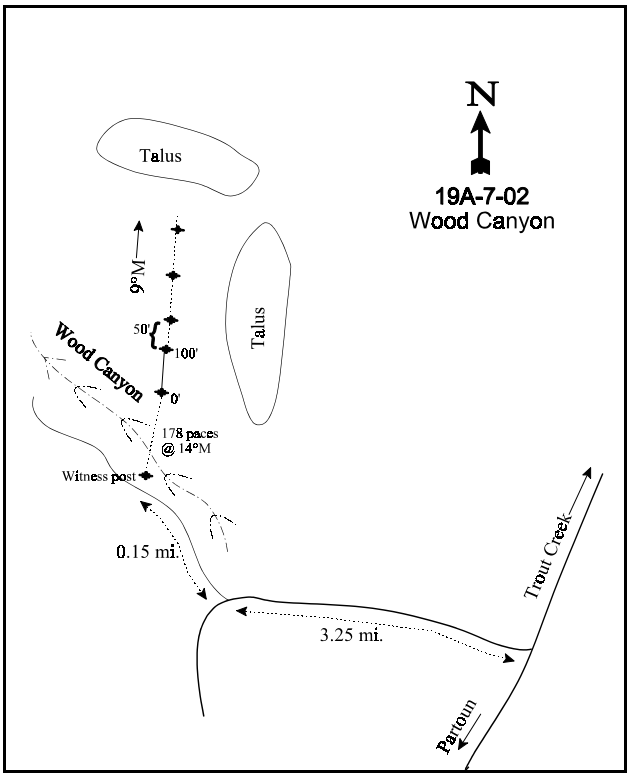
Compass bearing: frequency baseline 9 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 1 on 2ft, belt 2 on 1ft, and belt 2 on 1ft.

LOCATION DESCRIPTION

From Trout Creek on the Gandy Road through Snake Valley, go south to the old Partoun dump (Now covered over). Turn west and continue 0.7 miles to the Trough Springs turnoff. Take this road west for 3.25 miles to the turn-off to Wood Canyon. Turn right and go 0.15 miles to a witness post on the right side of the road. From the witness post, walk 178 paces north (14°M) to the 0 foot baseline stake which is behind a large rock. The baseline runs uphill at 9 degrees magnetic.





Map Name: Partoun

Diagrammatic Sketch

Township 13S , Range 18W , Section 7

GPS: NAD 27, UTM 12S 4398242 N 249391 E

DISCUSSION

Wood Canyon - Trend Study No. 19A-7

The Wood Canyon study is located on the southeast end of the Deep Creek Mountains. Elevation is 6,300 feet on a moderately steep (32-35%), south facing slope. The study was established in 1989 primarily to monitor bighorn sheep habitat, but it receives mostly winter use by deer. The local fauna includes chukars which were heard on the nearby ledges in both 1989 and 1997. Rugged cliffs cap the ridge north of the site with miles of vast open desert to the south and east. A stock pond one mile to the east is the closest apparent water source. A pellet group transect read on site in 2002 estimated 10 deer days use/acre (25 ddu/ha), <1 elk day use/acre (2 edu/ha), and 8 cow days use/acre (20 cdu/ha). Rabbit, horse, and grouse pellets were also sampled within the transect.

Soils are the Spager type, which are very gravelly. Effective rooting depth was estimated at 10 inches with a soil temperature averaging 71°F at a depth of 11 inches. Chemical and textural analysis indicates soils to be a loam with a mildly alkaline reaction (pH 7.4). Phosphorous levels in the soil were low (8.3 ppm), which may be limiting to normal plant growth and development. Erosion has been negligible on this site in spite of only fair vegetation and litter cover. However, rock and pavement are very abundant which armor the soil surface. The erosion condition class was determined as stable in 2002.

The browse component consists of a variety of species, although none are particularly abundant with the exception of broom snakeweed. Shadscale had an estimated density of 1,400 plants/acre in 1997, declining to 1,140 plants/acre in 2002. Utilization has been mostly light on shadscale, with percent decadence and poor vigor increasing with every reading. The number of dead in the population has steadily increased. The proportion of decadent plants classified as dying has been high at 75% in 1997 and 2002. The number of young plants (recruitment) in the population increased from 11% in 1997 to 30% in 2002, although this is not an adequate level to replace the plants being lost. Shadscale was not producing flowering stocks in 2002. Nevada ephedra had an estimated density of 320 plants/acre in 2002, an increase from 160 plants/acre in 1997. The number of young increased in 2002 , but three-fourths of the population displayed poor vigor. Use on ephedra has been mostly light to moderate in all years. Low density browse species that have also been sampled include winterfat, summer cypress, black sagebrush, cotton-thorn horsebrush, stickyleaf low rabbitbrush, prickly pear cactus, and yucca.

Broom snakeweed is the dominate browse on the site with an estimated density of 5,200 plants/acre in 1997 and 3,320 plants/acre in 2002. This is a mature population that is declining due to drought conditions. Percent decadence and poor vigor increased in 2002 whereas the number of young continues to decline.

Although cheatgrass is the most abundant grass on the site, it does not visually dominate due to its small stature. Cheatgrass significantly declined in nested frequency between 1997 and 2002, but still had the highest cover and frequency values in 2002. Galleta is the most abundant perennial grass. This species significantly increased in nested frequency between 1989 and 1997, but significantly decreased between 1997 and 2002 with the decrease in warm season precipitation. Other perennials sampled include Indian ricegrass, Sandberg bluegrass, bottlebrush squirreltail, sand dropseed, and needle-and-thread. Sum of nested frequency for perennial grasses increased between 1989 and 1997, but decreased between 1997 and 2002. Incidentally, the 1989 and 2002 readings occurred during periods of drought when perennial grass sum of nested frequency was lowest. The forb component is sparse, especially perennial species. No perennials were sampled in 2002, although only a few were sampled in either 1989 and 1997. Storksbill, a winter annual, was moderately abundant in 2002.

1989 APPARENT TREND ASSESSMENT

Soil erosion is detectable in small quantities, but overall trend appears to be moving towards stabilization. The excessive amounts of broom snakeweed should decrease as range conditions improve. Although limited, the key species are vigorous and productive under the current light utilization. Depending on domestic livestock management and possible changes in grazing strategies, the site can be expected to maintain the present equilibrium.

1997 TREND ASSESSMENT

Soil trend is stable with little erosion apparent. Much of the surface is covered by rock and pavement leaving little bare ground exposed. Trend for browse is stable, with little utilization on any browse species. Most browse species, with the exception of shadscale which makes up the majority of the key browse cover, appear to be stable with no great increases or decreases in densities. Shadscale increased in density with more young in the population in 1997. However, 75% of the decadent plants were classified as dying so the population could decline in the future. The herbaceous understory is slightly upward with an increase in sum of nested frequency for perennial grasses.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - slightly up (4)

2002 TREND ASSESSMENT

Trend for soil is slightly down. With drought in 2002, vegetation and litter cover declined, while bare soil increased. Trend for browse is down. Shadscale declined in density. The decadent age class is still dominated by dying plants which could result in a future population reduction. Poor vigor and percent decadence have also increased since 1997. All other palatable browse species occur in such low densities that they are unimportant on the site. Trend for the herbaceous understory is slightly down. No perennial forbs were sampled in 2002 and perennial grasses have a decreased sum of nested frequency value in 2002.

TREND ASSESSMENT
soil - slightly down (2)
browse - down (1)
herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Herd unit 19A, Study no: 7

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
G	Bromus tectorum (a)	-	$_{b}$351	$_{a}$304	-	100	100	6.15	2.00
G	Hilaria jamesii	$_{a}$59	$_{b}$119	$_{a}$78	25	47	35	4.03	.97
G	Oryzopsis hymenoides	$_{b}$63	$_{ab}$47	$_{a}$27	31	21	13	1.81	.60
G	Poa secunda	-	5	6	-	2	4	.06	.04
G	Sitanion hystrix	$_{ab}$15	$_{b}$17	$_{a}$2	8	10	1	.34	.03
G	Sporobolus cryptandrus	$_{a}$-	$_{a}$3	$_{b}$24	-	1	11	.06	.20
G	Stipa comata	$_{a}$8	$_{b}$52	$_{b}$50	6	24	23	1.50	1.16
Total for Annual Grasses		0	351	304	0	100	100	6.15	2.00
Total for Perennial Grasses		145	243	187	70	105	87	7.82	3.01
Total for Grasses		145	594	491	70	205	187	13.98	5.01
F	Alyssum alyssoides (a)	-	11	5	-	5	2	.02	.01
F	Astragalus spp.	3	1	-	2	1	-	.03	-
F	Erodium cicutarium (a)	-	$_{a}$83	$_{b}$239	-	33	85	1.17	1.92
F	Erigeron spp.	-	7	-	-	2	-	.03	-
F	Halogeton glomeratus (a)	$_{b}$13	$_{ab}$3	$_{a}$-	5	1	-	.00	-
F	Sphaeralcea grossulariaefolia	9	2	-	4	1	-	.03	-
F	Unknown forb-perennial	2	-	-	1	-	-	-	-
Total for Annual Forbs		13	97	244	5	39	87	1.20	1.93
Total for Perennial Forbs		14	10	0	7	4	0	0.09	0
Total for Forbs		27	107	244	12	43	87	1.29	1.93

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 19A, Study no: 7

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Atriplex confertifolia	42	33	2.31	.72
B	Ceratoides lanata	3	2	-	-
B	Chrysothamnus viscidiflorus stenophyllus	5	4	.53	.30
B	Echinocereus spp.	0	9	-	.01
B	Ephedra nevadensis	6	10	.78	1.25
B	Gutierrezia sarothrae	87	72	4.98	2.21
B	Kochia americana	0	5	.03	.03
B	Opuntia spp.	18	24	1.03	.82
B	Tetradymia spinosa	5	5	1.34	.21
Total for Browse		166	164	11.01	5.58

CANOPY COVER -- LINE INTERCEPT
Herd unit 19A, Study no: 7

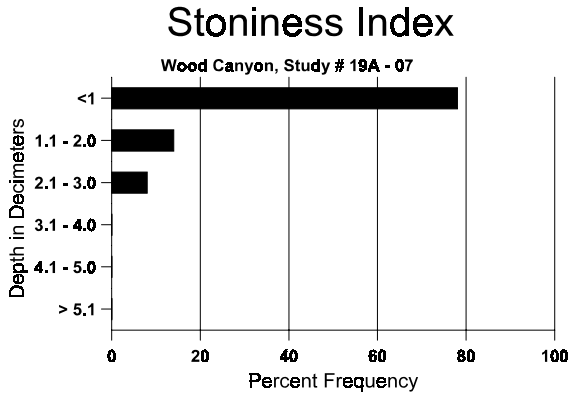
Species	Percent Cover '97	'02
Atriplex confertifolia	-	.83
Chrysothamnus viscidiflorus stenophyllus	-	.17
Ephedra viridis	-	1.75
Gutierrezia sarothrae	-	2.33
Kochia americana	-	.42
Opuntia spp.	-	.83

BASIC COVER --
Herd unit 19A, Study no: 7

Cover Type	Nested Frequency '97	'02	Average Cover % '89	'97	'02
Vegetation	362	325	7.25	29.85	13.73
Rock	330	342	23.25	29.92	34.00
Pavement	327	345	38.75	23.06	27.17
Litter	376	342	23.50	21.44	18.53
Cryptogams	63	19	0	.31	.44
Bare Ground	243	285	7.25	6.78	13.98

SOIL ANALYSIS DATA --
Herd Unit 19A, Study no: 7, Wood Canyon

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
10.4	71.0 (11.3)	7.4	50.0	31.4	18.6	1.5	9.2	233.6	0.8



PELLET GROUP FREQUENCY --
Herd unit 19A, Study no: 7

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'97	'02	'02	'02
Rabbit	4	4	-	-
Horse	-	1	44	N/A
Elk	2	-	9	1 (2)
Deer	9	10	131	10 (25)
Cattle	-	-	96	8 (20)
Antelope	-	-	52	4 (10)

BROWSE CHARACTERISTICS --
Herd unit 19A, Study no: 7

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	20	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	8	17	0
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'89	00%	00%	00%
'97	00%	00%	00%
'02	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	0		-
	'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex confertifolia																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	02	17	-	-	-	-	-	-	-	-	17	-	-	-	340			17
M	89	28	-	-	-	-	-	-	-	-	28	-	-	-	933	10	17	28
	97	35	7	5	-	-	-	-	-	-	46	-	-	1	940	10	23	47
	02	14	1	-	-	-	-	-	-	-	14	-	1	-	300	6	15	15
D	89	6	-	-	-	-	-	-	-	-	6	-	-	-	200			6
	97	13	3	-	-	-	-	-	-	-	3	-	1	12	320			16
	02	22	1	1	-	-	1	-	-	-	6	-	-	19	500			25
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	500			25
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	1060			53

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+19%
'97	14%	07%	20%	-19%
'02	04%	04%	35%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	1133	Dec:		18%
'97	1400			23%
'02	1140			44%

Ceratoides lanata																		
M	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66	11	15	2
	97	2	1	-	-	-	-	-	-	-	3	-	-	-	60	9	10	3
	02	-	-	1	-	-	-	-	-	-	1	-	-	-	20	5	10	1
D	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	1	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	-39%
'97	33%	00%	00%	-33%
'02	00%	100%	50%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	99	Dec:	33%
'97	60		0%
'02	40		50%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
M	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100	8	10	3
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	48	16	4
	02	1	-	1	-	-	-	-	-	-	2	-	-	-	40	7	17	2
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	02	2	-	-	-	-	-	-	-	-	1	-	-	1	40			2
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+ 0%
'97	00%	00%	20%	-20%
'02	00%	25%	25%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	100	Dec:		0%
'97	100			20%
'02	80			50%

Echinocereus spp.																		
Y	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	8	-	-	-	-	-	-	-	-	8	-	-	-	160	3	6	8

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	66	Dec:	-
'97	0		-
'02	200		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra nevadensis																		
Y	89	4	-	-	-	-	-	-	-	-	4	-	-	-	133			4
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	3	-	-	-	-	-	-	-	2	-	2	-	80			4
M	89	4	-	-	-	-	-	-	-	-	4	-	-	-	133	11	21	4
	97	7	1	-	-	-	-	-	-	-	8	-	-	-	160	17	35	8
	02	4	5	1	-	-	-	-	-	-	2	-	8	-	200	18	46	10
D	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	1	-	-	-	-	-	-	-	-	-	-	2	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	-52%
'97	13%	00%	00%	+50%
'02	56%	06%	75%	

Total Plants/Acre (excluding Dead & Seedlings)				
'89	332	Dec:		20%
'97	160			0%
'02	320			13%

Gutierrezia sarothrae																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	89	24	-	-	-	-	-	-	-	-	24	-	-	-	800			24
	97	18	-	-	-	-	-	-	-	-	18	-	-	-	360			18
	02	7	-	-	-	-	-	-	-	-	6	-	1	-	140			7
M	89	81	-	-	-	-	-	-	-	-	81	-	-	-	2700	7	6	81
	97	208	-	-	-	-	-	-	-	-	205	-	-	3	4160	8	12	208
	02	112	-	-	-	-	-	-	-	-	93	-	19	-	2240	5	9	112
D	89	31	-	-	-	-	-	-	-	-	15	-	13	3	1033			31
	97	34	-	-	-	-	-	-	-	-	8	1	-	25	680			34
	02	46	-	1	-	-	-	-	-	-	12	-	11	24	940			47
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	860			43
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	900			45

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	12%	+13%
'97	00%	00%	11%	-36%
'02	00%	.60%	33%	

Total Plants/Acre (excluding Dead & Seedlings)			
'89	4533	Dec:	23%
'97	5200		13%
'02	3320		28%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Kochia americana																		
Y	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	4	-	1	-	-	-	-	-	-	5	-	-	-	100	5	8	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	08%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	0		-
	'02	240		-

Opuntia spp.																		
Y	89	10	-	-	-	-	-	-	-	-	10	-	-	-	333			10
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	4	-	-	-	-	-	-	-	-	3	-	1	-	80			4
M	89	7	-	-	-	-	-	-	-	-	7	-	-	-	233	5	12	7
	97	19	-	-	1	-	-	-	-	-	20	-	-	-	400	10	17	20
	02	17	-	-	-	-	-	-	-	-	15	1	1	-	340	4	13	17
D	89	1	-	-	-	-	-	-	-	-	-	-	-	1	33			1
	97	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	02	4	-	-	-	-	-	-	-	-	1	-	1	2	80			4
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	06%	-23%
'97	00%	00%	04%	+ 8%
'02	00%	00%	20%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	599	Dec:	6%
	'97	460		4%
	'02	500		16%

Tetradymia glabrata																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10	23	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	0	Dec:	-
	'97	0		-
	'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Tetradymia spinosa																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	2	1	-	-	-	-	-	-	-	3	-	-	-	60	16	29	3
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	32	0
D	89	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	97	2	-	-	-	-	-	-	-	-	1	-	-	1	40			2
	02	5	-	-	-	-	-	-	-	-	-	-	2	3	100			5
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	+34%
'97	20%	00%	20%	+ 0%
'02	00%	00%	100%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	66	Dec:	100%
	'97	100		40%
	'02	100		100%

Yucca spp.																		
M	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33	18	37	1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'89	33	Dec:	-
	'97	0		-
	'02	0		-